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AUTHOR	Yu, Lei
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ABSTRACT

School violence has increasingly captured public attention due to deadly school shootings. Controversy on school violence is demonstrated by a mixed picture of school safety and the lack of consensus on the definition of violence, which makes comparison of findings across studies difficult. This study extended the application of the Rasch model to school violence research using data from the Third International Mathematics and Science Study (TIMSS). The results show that school violence occurred at a level much lower than expected. Across all grade levels the most frequently reported type of violence is intimidation or verbal abuse of students and the least frequently reported is physical injury to teachers or staff. The study also found that interpersonal conflict was more prominent at grade 8 than at grade 12. (Contains 3 figures, 4 tables, and 44 references.) (Author/SLD)

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Modeling School Violence across Grade Levels in the U.S.

Using the Third International Mathematics and Science Study (TIMSS)

Lei Yu

University of Toledo

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Abstract

School violence has increasingly captured public attention due to deadly school shootings. Controversy on school violence is demonstrated by a mixed picture of school safety and the lack of consensus on the definition of violence, which makes comparison of findings across studies difficult. This study extended the application of the Rasch model to school violence research using TIMSS data. The results show that school violence occurred at a level much lower than expected. Across all grade levels the most frequently reported type of violence is *intimidation or verbal abuse of students* and the least frequently reported *physical injury to teachers or staff*. The study also found that interpersonal conflict was more prominent at Grade 8 than at Grade 12.

Introduction

School violence, one of the most controversial issues (Miller, 1994) and biggest problems (Elliot, Hamburg, & Williams, 1998) facing the nation, has increasingly captured public attention due to deadly school shootings. It becomes not only a concern of the educators, the local and federal government, but also a focus of the media.

Controversy

Much like the topic itself, the related aspects of school violence are depicted contradictorily and inconsistently. First, publicized reports and published studies portrayed a mixed picture of school safety. On the one hand, schools are concluded not to be safe havens any more (Walker & Gresham, 1997; Shen, 1997; Smith, 1994; Stephens, 1997). A serious concern arises, as children are not as protected from intimidation and injury as they were (Elliot et al., 1998). Incidents of school violence are on the rise. The National League of Cities reports a significant increase of school violence in thirty-three cities between 1990 and 1994 (Johnson & Johnson, 1995). Schools throughout the country are no longer places where students can acquire freely the skills that will enable them to become "successful, productive, and contributing citizens" (Walker and Gresham, 1997). The safety of American children and youth can no longer be taken for granted (Hatkoff, 1994). School safety has become a top issue for all related parties -- parents, students, educators, and policymakers (Coleman, 1998). On the other hand, crime statistics show that school violence is exaggerated (Furlong & Morrison, 1996, Hyman, Weiler, Dahbany, Shanock, & Britton, 1996). According to the 1999 Annual Report on School Safety (U.S. Department of Education & U.S. Department of Justice, 1999), the overall school crime rates declined from 1993 to 1997, although violence,

gangs, and drugs still exist in some schools (Kaufman et al, 1999). The results from four nationally representative surveys also show that the level of violence declined from 1985 to1995 (Kingery, Coggeshall, & Alford, 1998). Therefore, the majority of American schools are still safe places for children and, in fact, becoming even safer, despite the reports on school violence (U.S. Department of Education & U.S. Department of Justice).

The contradictory picture of school safety causes confusion in understanding the real level of school violence. Hanke (1996) pointed out that school violence has been highlighted and exaggerated by media coverage since 1960s. Media coverage influences and fuels public opinion on school violence (the Annual 1999 Report on School Safety; Johnson & Johnson, 1995). Hyman and Perone (1998) warned that the data collection methods used in reports of school violence by media should be examined carefully. Morrison, Furlong, and Morrison (1994) cautioned against the accuracy of the methods in assessing school violence.

Second, there is no consensus on the definition of school violence (Furlong, Morrison, Chung, Bates, & Morrison, 1997). It is even believed impossible to find a single consistent definition that encompasses all situations (Hanke, 1996). When used by media, school violence is closely associated with shootings or stabbings, usually with a weapon, that occurs at schools and causes injuries or deaths. In research, however, school violence has a much broader meaning (Furlong, Casas, Corra, Chung, & Bates, 1997), covering a range of antisocial behaviors, from bullying to assaults (Baker, 1998).

Violence means as many things as to many people (Rozycki, 1994). Three themes characterize the existing definitions. First, violence is defined from the viewpoint of physical harm. Morrison, Furlong, and Morrison (1994) reframed school violence as

"harm" on the basis of its definitions in Webster's Dictionary: "physical force used as to injure or damage" and "an unjust use of force or power, as in deprivation of rights" (pp. 240-224). In the book edited by Elliot et al. (1998), the authors reached a consensus on the definition of violence, stating that violence means "the threat or use of physical force with the intention of causing physical injury, damage, or intimidation of another person", ranging from "homicide, aggravated assault, armed robbery, and forcible rape, the offenses included in the FBI violent crime index" to "shoving, punching, hitting, and throwing objects when the intent is to harm or intimidate another human being" (p.13). Secondly, both physical and nonphysical aspects are included in what is defined as violence. Soriano et al (1994) cited the California Commission on Teacher Credentialing Advisory Panel on School Violence, stating that violence "is a public health and safety condition which results from individual, social, economic, political, and institutional disregard for basic human needs. It includes physical and nonphysical harm which causes damage, pain, injury, or fear" (p. 218). Templeton and Johnson (1998) defined violence as both physical and psychological aggression that was directed towards others. Capozzoli and McVey (2000) refers to school violence as "any act of intimidation, threats, harassment, robbery, vandalism, physical assault such as fights, with or without a weapon (including rape, and other sexual battery), or murder that happens on school grounds or buses going to and from school" (p. 11). Similarly, Stephens (1994) considered any physical aggression (hitting, kicking, biting and shoving), vandalism, verbal harassment and intimidation as violence. Thirdly, violence is regarded as a continuum or hierarchy, rather than a single act. Flannery (1997) and Flannery and Singer (1999) proposed that school violence should be defined along a continuum of behaviors,

extending from aggression to violence. Flannery (1997) noted that violent behaviors have different manifestations in young (e.g. kicking, hitting, spitting) and old (e.g. bullying, physical fighting) elementary children, and adolescents (e.g., assaults, weapon carrying). Friedlander (1994) classified violence into three levels: Level One -- Severe Violence, including shooting, stabbing, and homicides; Level Two -- Moderate Violence, including stolen cars, thefts from lockers, purse snatching, burglaries, serious fighting without severe injury or death; and Level Three -- Mild Violence, including acts that do not involve physical contact; bullying, teasing, poking, pushing, and name calling.

Due to the lack of agreement on the definition of school violence, it is likely that there will be disagreement as to whether a certain act will be classified as "violent" or not (Morrison et al, 1994). Therefore, comparisons of findings across studies are difficult (Furlong et al., 1997). However, accurate data on school violence is essential and critical for policy makers and school administrators. An effort to create a fundamental measurement of school violence is necessary for such endeavors.

TIMSS

The Third International Mathematics and Science (TIMSS), conducted in 1994-1995 by the International Association for the Evaluation of Educational Achievement (IEA), was designed to measure student achievement in mathematics and science and their learning context in 41 countries. As the largest, most ambitious and most complex study into the differences in educational systems that shaped teaching and learning of mathematics and science, TIMSS assessed student math and science achievement at the primary school years (Population 1, equivalent to U. S. grade 3 and grade 4), middle school years (Population 2, equivalent to U.S. grade 7 and grade 8), and the final year of

school (Population 2, equivalent to U.S. grade 12). In addition, TIMSS also collected background information at the student, teacher and school level for the purpose of understanding achievement levels and identifying the factors contributing to educational attainment. Among an enormous array of contextual information in the questionnaires, school administration was asked to rate the frequency with which they dealt with students' inappropriate behaviors at their school. Misbehavior is "any act judged unacceptable by the school administration" (Rubel, 1977, p.1). School violence, in spite of the lack of a unanimous definition, is definitely subsumed under the category of misbehaviors at school.

There are three predominant methods in gathering data on school violence (Furlong & Morrison, 1994). In the first method school administrators are asked in questionnaires to provide information on the occurrence of school violence in their school. In the second method students are asked to report the number of times they have been victimized by acts of violence. The third method is an opinion survey, which seeks the opinion of school administrators, teachers, students, or the public on school violence. The data-gathering technique used in school background questionnaires in TIMSS falls into the first of these categories.

Related Research

Despite all the controversies, violence is a much-explored area of study. For the past few decades, the nature of discipline and violence problems has changed drastically (Kaufman & Center, 1992; Rubel, 1977). Johnson and Johnson (1995) noted that violence is becoming the norm rather than the exception. Crews and Counts (1997) found

that violence against teachers and other students has been dramatically on the rise. Direct physical or verbal aggression becomes more common (Kaufman & Center, 1992).

Mitchell (2000) found that crime rates are correlated with grade levels. Elementary schools were much less likely than either the junior high or high schools to report any types of crime (Capozzoli & McVey, 2000; Kaufman et al, 1999; Quarles, 1993). Quarles (1993) also noted that the junior high is historically at the highest risk in most types of violence and high school is next highest. Elementary schools are the least likely to report almost all types of violence. The most frequently reported crime in 1996-97 at the middle and high school levels is physical attack or fight without a weapon; theft was more prevalent at the high school than at the middle school level (Kaufman et al., 1999). Weapon carrying has become an increasing source of violence (Hamburg, 1998).

Use of alcohol and drugs is regarded as another dimension of school violence (Coleman, 1998), as it leads to the loss of self-control and violent acts (Johnson & Johnson, 1995). Levine and Kozak (1979) found that alcohol use was substantially higher than marijuana use while Kaufman et al (1999) found that their use remained stable between 1993 and 1995, with marijuana use increasing with grade levels 9 through 12.

Research Questions

School violence is a complex phenomenon. The lack of consensus on the definition and inconsistent search findings and media coverage portrayed a conflicting and incomplete picture of school safety. There is no doubt that violence occurs in schools. However, is violence rampant at schools? Does violence rule the school day? The study focuses on analyzing the levels and patterns of school violence at Grade 4, Grade 8 and Grade 12. The research questions are:

1. What is the nature of violence in school setting?

2. What are the patterns of school violence at Grade 4, Grade 8 and Grade 12 levels?

3. What are the most prevalent types of school violence at these different grade levels?

Method

Sample

This study utilized the data gathered in the school background questionnaires in TIMSS across three populations. TIMSS used a two-stage cluster sampling design, with schools as the first stage of selection and classrooms within schools as the second stage selection (User's Guide, 1998). In the first stage representative samples of schools were selected from sampling frames that contained all eligible students. To ensure a required student sample size of 400, at least 150 schools were selected for each population. The final sample sizes for schools are 189 for Population 1, 183 for Population 2, and 211 for Population 3.

Instrument

While literature review indicates a lack of consensus on the definition, school violence in this study is operationally defined as a continuum of physical and nonphysical aggression. To be specific, the following behaviors were extracted from TIMSS bank of items and used as indicators of school violence: *vandalism, theft, intimidation or verbal abuse of other students, physical injury to other students, intimidation or verbal abuse of teachers or staff, physical injury to teachers or staff, alcohol use/possession, illegal drug use/possession, weapon use/possession,* and *inappropriate sexual behavior*. Data on these items came from the responses to the question "About how often does the school administration or staff have to deal with following behaviors among Grade 4/Grade

8/Grade 12 students?" in TIMSS school background questionnaires. The rating scale has four categories: rarely, monthly, weekly and daily. As the last four indicators of school violence were not administered to Grade 4 school administrators, no relevant data were available.

Analysis

This study was conducted using the probabilistic conjoint Rasch measurement model (Wright & Masters, 1982). The Rasch model is often used to create a measure out of the items assessing a unidimensional construct, representing a continuum along which items and persons are ordered on the basis of the amount of the trait they possess. One of the advantages of the Rasch model is that persons and items are placed on a common interval scale that is obtained by transforming raw scores to logits through a mathematical model. Thus, a person's amount of the trait that is being measured is related to the items in the context of the responses from the rest of the sample. In addition to creating an abstraction of equal units and drawing inferences about the properties of the construct that transcends the actual observations, the Rasch analysis provides statistics to evaluate the reliability and validity of the instrument and to flag misfitting items and aberrant persons. Although the Rasch model is widely used in assessing student achievement, its application in analyzing school violence data is a meaningful and significant extension.

The Rasch model produces average as well as individual measures for the set of items and persons in the analysis. The average item difficulty is arbitrarily and conveniently set to zero so that the average person measure can be compared to that of the items. In addition, the Rasch analysis also produces two sets of reliability and

separation indices, one for item, and the other for person. The reliability index is analogous to Cronbach's alpha, bounded by 0 and 1. The item reliability index indicates replicability of item placement when the same set of items is given to another sample. The person reliability index indicates replicability of person placement when the same set of persons was given another set of items measuring the same construct. The separation index refers to the spreading of items or persons, with an acceptable level of 2 or greater.

To compare incidence of school violence across three grade levels as reported by school administration, data from these three samples were stacked in order to establish a shared rating scale and examine the fluctuation of average school measure across each sub-sample. Next, free calibrations centered on each sub-sample were conducted to obtain item measures for cross-grade comparison. Finally, item estimates from G8 and G12 were further investigated for differential item functioning via the procedure of common item equating (Wright & Masters, 1982). To facilitate interpretation of results, mean is set to be 50 and 1 logit rescaled to be 9.1 so that the instrument scale cover 0 to 100 with increments of 10 units (from email correspondence with Ben Wright, 2001).

Results

The Combined Analysis

The Rasch analysis was conducted using WINSTEPS 2.98 (Linacre & Wright, 1999). The average reported level of school violence across three grades was 28.94, comparatively lower than the mean incidence of violence, which was 50. Therefore, this sample of school administrators found it relatively difficult to agree with these 10 violence items and reported lower incidence of violence at their schools. Examined

separately, the average reported incidence of violence was 25.9 for Grades 4, 29.51 for Grade 8, and 30.09 for Grade 12.

Item reliability and item separation from the combined analysis are 0.99 and 8.12 respectively, indicating these are very good and well-separated items. However, person reliability and person separation are comparatively low (0.64 and 1.35), which suggests that the estimates of incidence of violence obtained for these schools are relatively unstable and less likely to be replicated when these schools were given another measure of school violence. One of the reasons is the number of items is much smaller as compared to the large number of persons.

Figure 1 presents an item-person map for the combined analysis of three grade levels, which shows that the hierarchical order of types of violence is consistent with expectations. The most frequently reported type of violence is *intimidation or verbal abuse of students*, and the least frequently reported type of violence is *physical injury to teachers or staff*. The lack of items targeted at the cluster of schools at the left bottom suggests that either the schools were low on reported incidence of violence, or, there are other types of violence these schools had to deal with, but were not included in the questionnaire.

INSERT FIGURE 1 ABOUT HERE

Fit statistics are provided in Table 1. WINSTEPS produces four fit statistics, two for infit and two for outfit, each of which consists of mean square (MNSQ) and t (ZSTD). Generally, infit statistics are considered more informative (McNamara, 1996). Mean

square values in the range of 1.30 and .70 are acceptable and those outside the range are considered as misfitting. Similarly, T values outside the range of -2 to +2 are misfitting. Based on these criteria, three items, alcohol use, physical injury to teachers or staff, and inappropriate sexual behavior are slightly misfitting items. Examination of the response pattern for these items reveals the reasons for misfit. For instance, Item 7 (alcohol use), with a measure of 53.6, is an average item. Both the infit and outfit statistics of the item are high, because one school, with an ability estimate of 39.1, reported dealing with alcohol use daily and another one, with an ability estimate of 12, reported dealing with it monthly. These are beyond the model's expectation of response to that item from the school's overall reported violence.

INSERT TABLE 1 ABOUT HERE

Free Calibrations

Next, free calibrations centered on each sub-sample were conducted for cross-grade comparison. For Grade 4 the most frequently reported type of school violence is *intimidation or verbal abuse of other students*, and the least frequently reported *physical injury to teachers or staff*. Fit statistics show no misfitting items (see Table 2).

INSERT TABLE 2 ABOUT HERE

For Grade 8 the most reported type of school violence is *intimidation or verbal abuse of other students*, and the least frequently reported *physical injury to teachers or*

staff and *weapon use/possession*. Item statistics for Grade 8 were presented in Table 3, which shows two items, Item 6 and Item 10, are misfits. An examination of their response string shows that a school, with a reported level of violence of 1.87, dealt with inappropriate sexual behaviors (item difficulty being .50) rarely, but dealt with *physical injury to teachers or staff* (item difficulty being 2.39) daily. Another school, with a reported level of violence of -2.47, also dealt with *physical injury to teachers or staff* daily.

INSERT TABLE 3 ABOUT HERE

For Grade 12 the most frequently reported type of violence is *intimidation or verbal abuse of students*, and the least frequently reported *physical injury to teachers or staff*, similar to other two grade levels. Item statistics were presented in Table 4, which shows no misfits.

INSERT TABLE 4 ABOUT HERE

Cross-Grade-Level Comparison

Comparison of item measures from each sub-sample is presented in Figure 2. The plot shows that *vandalism*, *theft*, *physical injury to teachers or staff*, *alcohol use/possession*, *illegal drug use/possession*, *weapon use/possession* and *inappropriate sexual behaviors* were more frequently reported with students at Grade 12 than those from other grade levels. While the reported incidence of *intimidation of other students*

and *physical injury to other students* was highest with Grade 8, next higher with Grade 12 and the lowest with Grade 4, the reported frequency of intimidation or verbal abuse of teachers or staff decreased from Grade 8, to Grade 12 and to Grade 4.

INSERT FIGURE 2 ABOUT HERE

To detect differential item functioning equating of item measures between G8 and G12 were conducted and presented in Figure 3. The items that fall within the 95% control lines, i.e., *vandalism*, *theft*, *physical injury to teachers or staff*, *weapon use/possession*, and *inappropriate sexual behavior* remain invariant across the two grade levels. Three items, *intimidation or verbal abuse of other students*, *physical injury to other students* and *intimidation or verbal abuse of teachers or staff*, were reported to occur more frequent at Grade 8 while illegal drug use/possession and alcohol use/possession were reported to happen more frequently at Grade 12.

INSERT FIGURE 3 ABOUT HERE

Discussion

The findings of this study are very informative. First, results show that school violence occurred at a level much lower than expected across all three grades. This is inconsistent with the conceptualization of Johnson and Johnson (1995).

Secondly, there are similarities and differences in the patterns of violence across grade levels. In all school levels the most likely reported type is *intimidation or verbal*

abuse of students, and the least likely reported is *physical injury to teachers or staff*. While *intimidation or verbal abuse of other students, physical injury to other students* and *intimidation or verbal abuse of teachers or staff* were reported to happen more frequently with Grade 8 students, *alcohol use/possession, illegal drug use/possession* were reported to occur more frequently at Grade 12. This shows that interpersonal conflicts are very prominent at junior high schools. It is highly recommended that various sources of support, such as those from teachers, counseling programs and parents should be made available to these students for consultation and help on solving conflicts among students themselves and between students and teachers or staff. With age growing, students begin to be more affected with unhealthy adult behaviors, such as alcohol use and illegal drug use.

Thirdly, statistics from the Rasch analysis demonstrate that the violence measures have are very good reliability and separation estimates while the measured schools show comparatively lower reliability and separation, decreasing from junior high to senior high to elementary schools. The evaluation of instruments suggests that more items measuring violence should be introduced so that schools can be better targeted and separated. For instance, research shows that bullying is another significant and pervasive problem facing schools (Crews & Counts, 1997; Loeber & Stouthamer-Loeber, 1998; Stephens, 1997), which is seriously underrated (Stephens, 1997). Bullying, which can be both direct and indirect, includes "teasing, taunting, threatening, hitting, stealing" (Banks, 2000). And gangs is another threat to school safety (Stephens, 1997). Therefore it is suggested that more violence measures, such as bullying and gangs, be introduced into the instrument.

An issue about self-reported data is the validity of the data (Coomey, 1992), which should not be neglected in studies on school violence in particular, as educators are reluctant to admit the occurrence of violence at their school as it hurts its reputation (Morrison et al, 1994). Quarles (1993) pointed out two serious problems concerning the report of school violence data: denial and underreporting. School administration is reluctant to tell the truth so that the teachers are misinformed about violence at their school. In addition, schools or districts underreport crime rate or report them at a less serious level. As with other studies using questionnaire as a data collection method, data collected in TIMSS and used in the study may encounter the issues which are inherent in all survey research in general and which are typical of violence research in particular. Therefore, the results should be interpreted and understood with caution. However, the Rasch modeling used in the study overcomes some of the problems. For instance, the reliability of school responses is reflected in the reliability index generated by the model. The low reliability cautioned the researchers and the interested readers to the quality of the responses. And the fit statistics flag misfitting items or schools.

A safety school is essential for teaching and learning (Kaufman et al, 1999). Without safety teachers cannot teach and students cannot learn. The challenge facing educators and policy makers is to develop effective measures to control and decrease school violence on the grounds of its reported trends (Education Commission of the States, 1996). Truthful reports of data and standardization of the instrument and measurement procedure are crucial for such undertakings.

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Table 1

Item Statistics for the Combined Analysis

ITEMS STATISTICS: MISFIT ORDER

ENTRY NUMBER	RAW SCORE	COUNT	MEASURE	INFIT ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	SCORE CORR.		ITEMS
7	319	238	53.6	1.2	1.32	2.3	1.82	3.0	A	.44	ALCOHOLUSE
6	314	300	74.4	2.7	1.78	2.1	1.22	.3	B	.34	PHYSIINJT
10	313	238	54.5	1.2	1.36	2.4	1.36	1.4	C	.44	INAPPROSEX
8	317	237	53.7	1.2	1.18	1.3	1.16	.7	D	.52	ILLEGALDRUG
9	267	240	65.9	1.9	1.14	.6	.62	-1.1	E	.45	WEAPONUSE
5	486	310	46.1	.8	1.09	.9	.87	-.9	e	.67	INTIMITEA
4	548	310	41.7	.8	1.05	.5	.93	-.6	d	.65	PHYSIINJS
1	524	310	43.3	.8	.96	-.5	.83	-1.5	c	.70	VANDALISM
3	840	310	25.5	.7	.86	-2.0	.86	-1.4	b	.67	INTIMISTU
2	551	309	41.4	.8	.85	-1.8	.81	-1.8	a	.69	THEFT
MEAN	448.	280.	50.0	1.2	1.16	.6	1.05	-.2			
S.D.	169.	34.	13.0	.6	.26	1.5	.33	1.4			

Table 2

Item Statistics for Grade 4

ENTRY NUMBER	RAW SCORE	COUNT	MEASURE	INFIT ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	SCORE CORR.		ITEMS
2	96	69	74.7	2.2	1.19	.8	1.32	.8	A	.69	THEFT
4	126	69	62.6	1.7	1.19	1.0	1.03	.2	B	.79	PHYSIINJS
5	95	69	75.2	2.2	1.17	.7	.79	-.6	C	.69	INTIMITEA
1	93	69	76.4	2.3	.97	-.1	.76	-.7	b	.71	VANDALISM
3	190	69	45.0	1.6	.64	-2.6	.73	-1.6	a	.91	INTIMISTU
MEAN	120.	69.	66.8	2.0	1.03	.0	.93	-.4			
S.D.	37.	0.	12.0	.3	.21	1.3	.22	.8			

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Table 3

Item Statistics for Grade 8

ENTRY NUMBER	RAW SCORE	COUNT	MEASURE	ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	SCORE CORR.		ITEMS
6	117	111	97.8	3.9	2.38	2.4	2.95	1.2	A	.61	PHYSIINJT
10	141	113	80.6	2.0	1.74	2.9	1.23	.5	B	.66	INAPPROSEX
8	122	112	92.3	3.1	1.03	.1	1.36	.4	C	.68	ILLEGALDRUG
9	120	114	97.8	3.9	1.27	.6	.63	-.4	D	.67	WEAPONUSE
7	119	112	96.1	3.7	1.11	.3	.47	-.7	E	.67	ALCOHOLUSE
5	206	115	63.9	1.3	1.05	.4	.93	-.4	e	.74	INTIMITEA
4	222	115	61.0	1.3	.93	-.5	.85	-1.0	d	.77	PHYSIINJS
2	208	115	63.5	1.3	.86	-1.1	.75	-1.4	c	.78	THEFT
1	190	115	67.2	1.4	.82	-1.3	.69	-1.6	b	.77	VANDALISM
3	341	115	41.3	1.3	.71	-2.5	.70	-2.1	a	.80	INTIMISTU
MEAN	179.	114.	76.2	2.3	1.19	.1	1.06	-.5			
S.D.	67.	1.	18.6	1.1	.48	1.5	.68	1.0			

Table 4

Item Statistics for Grade 12

ENTRY NUMBER	RAW SCORE	COUNT	MEASURE	ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	SCORE CORR.		ITEMS
10	172	125	72.9	1.6	1.32	1.7	1.47	1.5	A	.56	INAPPROSEX
7	200	126	66.9	1.3	1.24	1.5	1.45	1.9	B	.61	ALCOHOLUSE
9	147	126	82.6	2.3	1.12	.4	.66	-.9	C	.56	WEAPONUSE
1	241	126	60.0	1.2	1.12	.9	.98	-.1	D	.73	VANDALISM
6	132	124	94.0	3.8	1.02	.1	.25	-1.3	E	.51	PHYSIINJT
8	195	125	67.6	1.3	1.00	.0	.96	-.2	e	.68	ILLEGALDRUG
3	309	126	50.6	1.1	.97	-.3	.91	-.6	d	.79	INTIMISTU
4	200	126	66.9	1.3	.96	-.3	.83	-.9	c	.69	PHYSIINJS
5	185	126	70.0	1.4	.96	-.3	.84	-.7	b	.66	INTIMITEA
2	247	125	58.9	1.2	.85	-1.2	.81	-1.2	a	.76	THEFT
MEAN	203.	126.	69.0	1.6	1.05	.2	.92	-.2			
S.D.	49.	1.	11.6	.8	.14	.9	.34	1.0			

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Figure 1

Map of Schools and Items

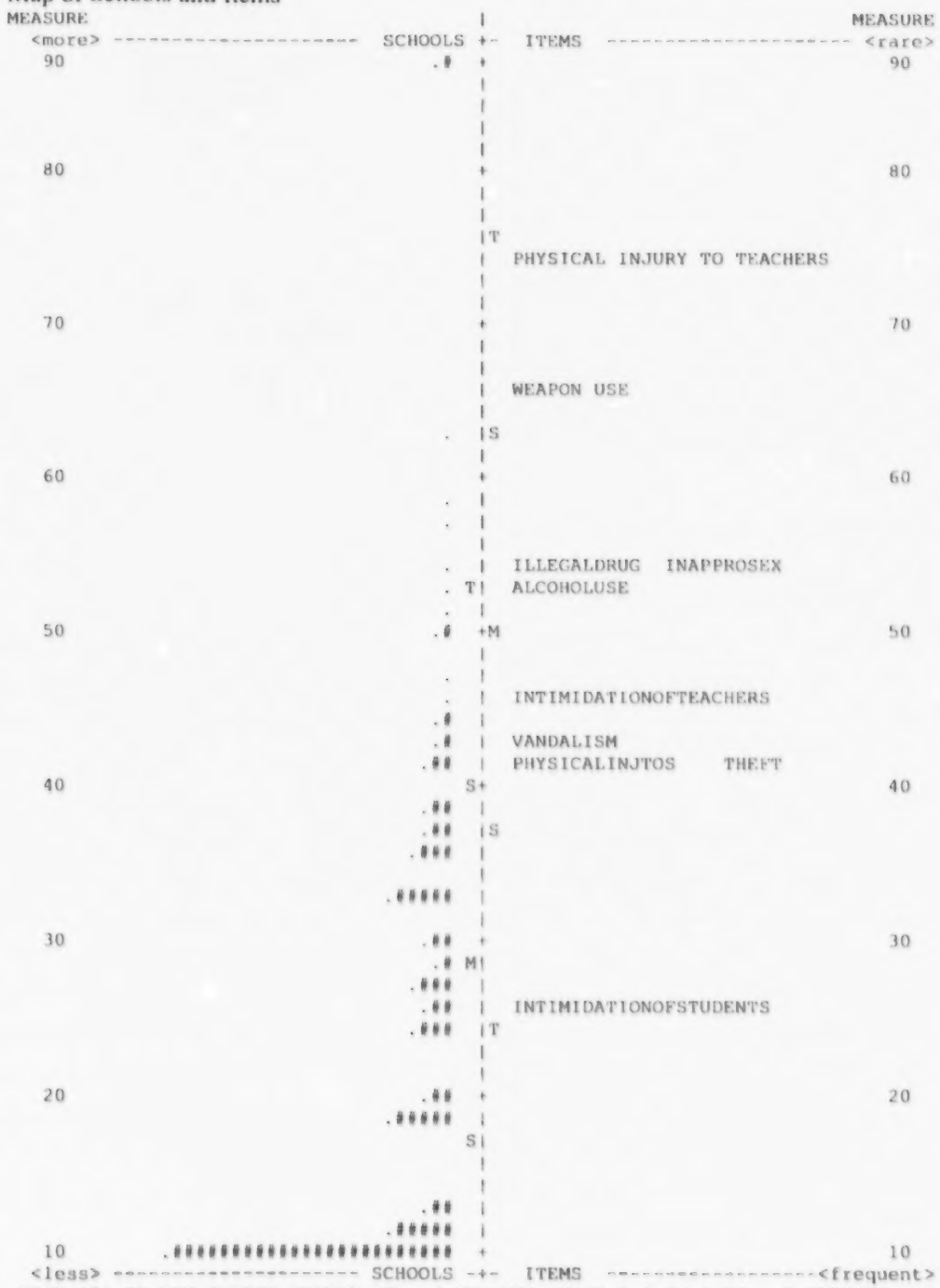

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Figure 2

Comparison of Item Estimates across All Grade Levels

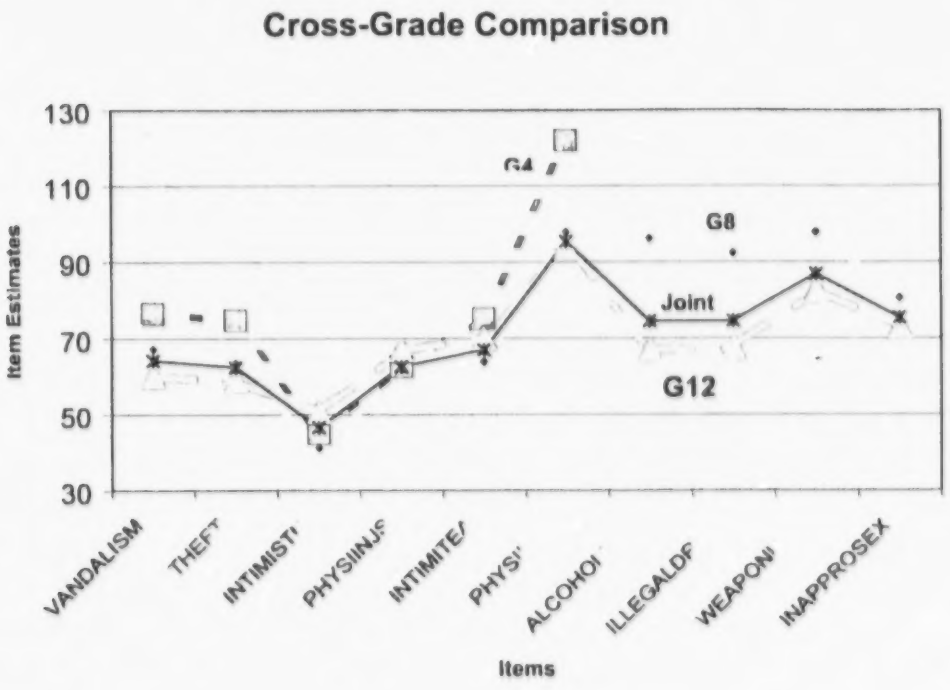

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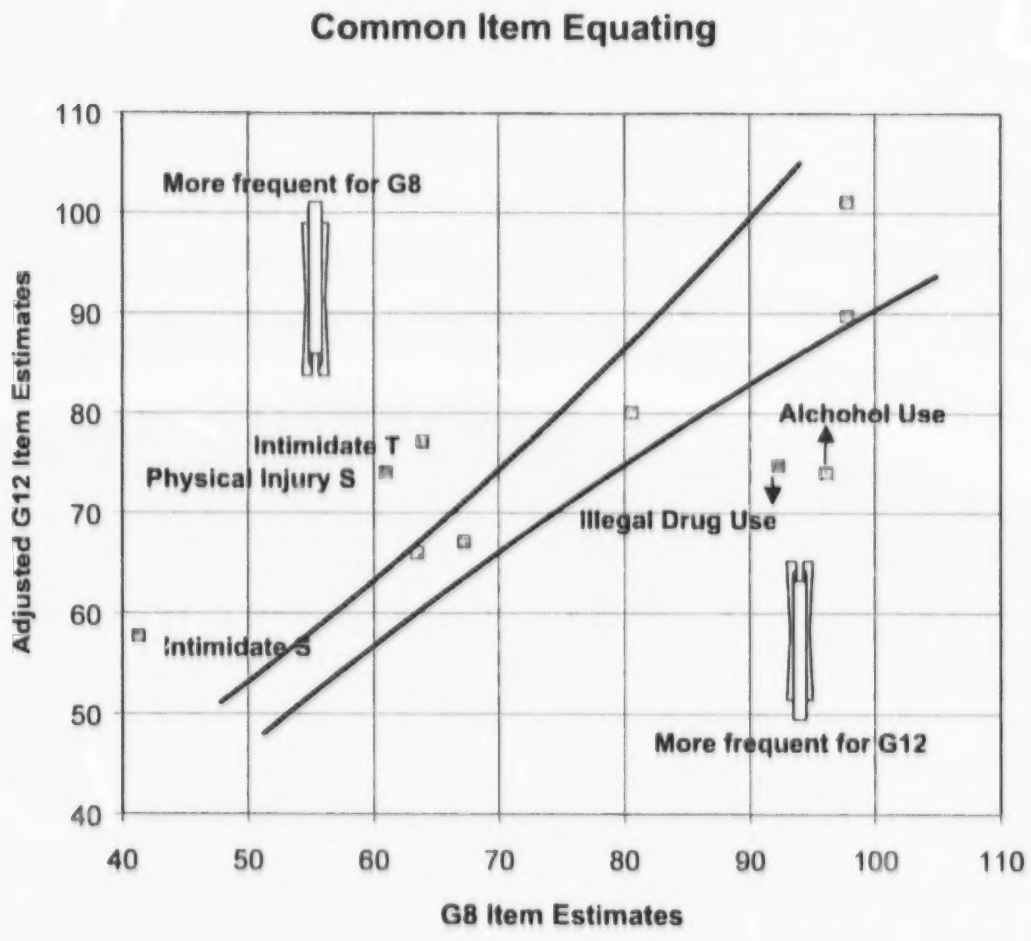
Figure 3

Item Equating Between Grade 8 and Grade 12



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Organization/Address: ETS, Rosedale Road, MS 15L, Princeton, NJ 08541	Telephone: 609-683-2383 FAX: 609-683-2150
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